REMARKS

These remarks are in reply to the Office Action mailed April 14, 2005.

Objections to the Specification

The specification stands objected to as improperly incorporating subject matter from another application. The Office Action suggests in paragraph 5a that this objection can be overcome by submitting a declaration by applicant's attorney that the amendatory material consists of the same material incorporated by reference in the referencing application, and by deleting the incorporation by reference statement. Applicant's attorney has in response attached an appropriate statement, and the incorporation by reference statement has been deleted from the application.

Obviousness Rejections

The invention as now claimed relates to the problem of illuminating sample surfaces for tunable filter-based infrared reflectance imaging spectrometers. These spectrometers can be used to monitor chemical properties of surfaces in a variety of settings, such as in pharmaceutical, agricultural, and polymer industries. To obtain the best signal-to-noise ratio in these instruments, large, high-intensity illumination sources have typically been used. These sources tend to be expensive, draw large amounts of electrical power, and generate a lot of heat. And even the best of these sources do not provide enough light for optimum spectral measurements in many instances.

The invention as now claimed in amended claim 41 proposes a very different approach. The sample is illuminated with differently directed beams of broadband infrared light from different positions at the same time using broadband sources of a same type, and a tunable filter is then used to select wavelengths of interest from the broadband infrared light after it has reflected off of the sample. A spectroscopic signal can then be derived from relative amounts of infrared light from the differently directed broadband beams. This signal includes two-dimensional spatial information about the chemical properties of the sample surface at different wavelengths.

This approach allows imaging infrared reflectance spectrometers to create higher-quality images. Specifically, illuminating a sample with differently directed beams of infrared light from different positions can prevent shadows from being created on the sample, and thus allows better spectral and spatial information about the sample to be reflected to a two-dimensional image detector. Illuminating a sample with differently directed beams of light can also allow all of the areas of even the most irregularly shaped sample to be uniformly illuminated with infrared light. The result is a two-dimensional image that does not exhibit darker and lighter areas, but instead shows a uniform picture of the chemical properties of a surface.

Claim 41 stands rejected as obvious over Kley et al. in view of Erickson. Kley et al. disclose a non-invasive technique for measuring blood analyte concentration in mammals. In this technique, electromagnetic energy from a light source is passed through the tissue being sampled (typically the ear lobe or finger) to one or more detectors (col. 4, lines 21-24, col. 8, lines 65-67). A combination of sources are said to be used to provide a broad spectral response (col. 6, lines 53-55).

But Kley et al. do not disclose a two-dimensional spectrometric imaging method that uses a tunable filter to select wavelengths of interest from broadband infrared light from different sources after it has reflected off of a sample. Kley et al. instead disclose a non-invasive technique that uses different filters to produce an analyte concentration measurement for mammals. Nowhere do Kley et al. disclose or suggest the idea of using a tunable filter to select wavelengths of interest from broadband infrared light from different sources after it has reflected off of a sample in two-dimensional spectrometric imaging method.

Kley et al. were concerned with an entirely different type of problem. Rather than trying to understand the two-dimensional distribution of chemical properties on a surface, they tried to measure the concentration of a blood analyte located inside live mammalian tissue. This is a very different problem, and it in no way teaches the desirability of providing for the detection of a two-dimensional infrared reflectance image of a sample surface illuminated with differently directed beams of infrared light from different positions using a tunable filter. One of ordinary skill in the art therefore would not have

been motivated to modify the Kley et al. in such a way as to obtain the invention as now claimed in amended claim 41.

Erickson presents instruments with an array of light-emitting diodes or lasers that shine light through a turbid sample at particular discrete wavelengths (col. 1, line 34). These instruments each include a collimator or modulator array (14, 28) that discriminates against off-axis light. Erickson states that this selection of on-axis light is "necessary" (col.1, lines 39-41).

But Erickson fails to disclose a two-dimensional spectrometric imaging method that uses a tunable filter to select wavelengths of interest from broadband infrared light from different sources at different locations after it has reflected off of a sample. Erickson instead discloses a device that <u>sends discrete wavelengths of light through a turbid sample</u>. Nowhere is there any teaching or disclosure to a two-dimensional spectrometric imaging method that uses a tunable filter to select wavelengths of interest from broadband infrared light from different sources at different locations <u>after it has reflected off of a sample</u>.

Erickson's teachings are also inconsistent with the application of his instruments to reflective measurements from multiple sources at different locations. Specifically, Erickson's device employs collimation or modulation to select for on-axis light that penetrates through a turbid sample without being scattered, and his disclosure qualifies this selection of on-axis light as "necessary" (col.1, lines 39-41). It is unclear how one would modify a system with this on-axis light selection to work in reflectance where light is reflected from different locations. Which light would be on-axis, and which would be off-axis? One of ordinary skill in the art would therefore not have been motivated to modify the Erickson device to use a tunable filter to select wavelengths of interest from broadband infrared light from different sources at different locations after it has reflected off of a sample.

Claims 1 and 58 distinguish over the prior art of record for at least reasons similar to those advanced in support of claim 41. The remaining claims are dependent and should be allowable for at least the reason that they depend on an allowable claim. Claims 65 and 66 are new and their examination is respectfully requested.

Should further questions arise concerning this application, the Examiner is invited to call Applicants' representative at the number listed below. The Commissioner is hereby authorized to charge any additional fees that may be required, or credit any overpayment, to Deposit Account No. 50-0750.

Respectfully submitted,

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Dated

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